LAURI LINNA

MASTER'S THESIS

AALTO UNIVERSITY

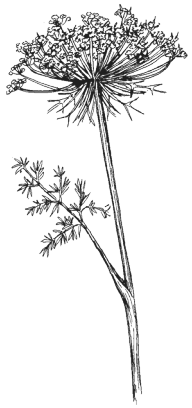
2018

# PORKKANA

CARROT

Lauri Linna

# PORK KANA CAR ROT



Master's thesis for the degree of Master of Arts, 30 credits
Thesis supervisor Prof. Pia Lindman
Master's programme in Visual Culture and Contemporary Art (ViCCA)
School of Arts, Design and Architecture
Aalto University
2018

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Master of Arts thesis abstract

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**Title of thesis** PORK KANA CAR ROT
**Department** Department of Art
**Degree programme**
Master's programme in Visual Culture and Contemporary Art
**Year** 2018
**Number of pages** 65 **Language** English

**Abstract**

My artistic research investigates carrots (Daucus carota subsp. sativus) existence, history, life and the relationship between carrot and humans. As artistic practice I have grown non-selectively bred carrot seeds in my garden lot in Helsinki, Finland. I have developed a method of non-selective breeding as a counter part for selective breeding. Selective breeding is the method of breeding organisms in a way that produces desired organisms that are pleasing to humans, may the reasons be economic reasons (e.g. livestock and vegetables) or purely aesthetical (e.g. ornamental plants). Non-selective breeding is a method of not choosing the parent organisms that are allowed to reproduce and produce offspring that has the desired characteristics. PORK KANA project is about letting the organism have its own sex life and self-determination about its offspring and future.

In this thesis I will discuss my relationship with the carrot. Also, some relevant carrot and plant research and thinking is discussed. Art and artists related to plants and biology are presented. All this mixes with my own memories of life and the history of carrot life. The thesis also documents some knowledge gathered through different conversations with people working with different organisms as a hobby or profession, e.g. vegetable seller, people speaking to plants and amateur gardeners. The possibilities of future of PORK KANA is discussed.

Attached to the printed version of the thesis are vials containing the first non-selectively bred PORK KANA carrot seed varieties #001, #002 and #003.

**Keywords** Carrot, Daucus carota, Seeds, Plants, Botany, Gardening, Plant neurobiology, Plant philosophy, Vegetables, Breeding, Selective breeding, BioArt, Bio art, Environmental art, Performance art, Plant aes-thetics, Plant memory, Inherited trauma, Genetics, Hybrids, Hybridization, Biology

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**Tekijä** Lauri Linna
**Työn nimi** PORK KANA CAR ROT
**Laitos** Taiteen laitos
**Koulutusohjelma**
Master's programme in Visual Culture and Contemporary Art
**Vuosi** 2018
**Sivumäärä** 65 **Kieli** Englanti

**Tiivistelmä**

Taiteellinen tutkimukseni tutkii porkkanoiden (Daucus carota sativus) olemassaoloa, historiaa ja elämää, sekä meidän ihmisten suhdetta niihin. Olen työskennellyt PORK KANA projektin parissa vuodesta 2014. Taiteellisessa työskentelyssäni olen kasvattanut epäjalostettuja porkkanan siemeniä viljelyspalstalla Helsingissä. Olen kehittänyt epäjalostamisen metodin vastapainoksi jalostustoiminnalle. Jalostaminen on risteyttämistä, jolla pyritään tuottamaan joko kaupallisesti (esim. tuotantoeläimet ja vihannekset) tai esteettisesti miellyttäviä eliöitä (esim. koristekasvit). Epäjalostaminen on puolestaan keino, jossa kieltäydytään valikoimasta niitä eliövanhempia, jotka saavat lisääntyä ja tuottaa halutun kaltaisia jälkeläisiä. PORK KANA projektissa pyritään antamaan organismille päätäntävalta sen omasta seksielämästä ja itsemääräämisoikeus sen omista jälkeläisistä ja tulevaisuudesta.

Tässä opinnäytteessä käsittelen omaa suhdettani porkkanaan. Samalla käydään läpi joitain porkkanoihin ja kasveihin liittyvää viimeaikaista tutkimusta ja ajattelua. Käyn myös läpi kasveihin ja biologiaan liittyvää taidetta ja taiteilijoita. Kaikki tämä sekoittuu omiin muistoihini elämästäni ja porkkanan omaan historiaan. Opinnäytteessä dokumentoidaan sitä tietoa mitä minulle on kertynyt keskusteluista erilaisten eliöiden kanssa työskentelevien henkilöiden kanssa, joita ovat esimerkiksi vihanneskauppias, kasveille puhuvat ihmiset ja puutarhaharrastajat. Myös PORK KANA -projektin porkkanoiden tulevaisuutta hahmotellaan.

Liitteenä opinnäytteen painetussa versiossa on koeputkia, joiden sisällä on PORK KANA -lajikkeiden #001, #002 ja #003 siemeniä, jotka ovat ensimmäiset epäjalostetut porkkanan siemenet.

**Avainsanat** porkkana, Daucus carota, siemenet, kasvit, kasvitiede, puutarha, viljely, kasvimaa, kasvineurobiologia, kasvifilosofia, kasvikset, jalostaminen, biotaide, ympäristötaide, performanssitaide, kasviestetiikka, kasvimuisti, periytyvä trauma, genetiikka, hybridit, risteyttäminen, biologia

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## PORK KANA project

Since 2014 I have been studying plant life and in particular the companion plants we humans have and how we affect their life. The organism that I have chosen to work with is the carrot. I offer a possibility for carrot life in my garden lot in Helsinki, Finland. I have named this project as PORK KANA or in English CAR ROT. PORK KANA is a word play on the Finnish word "porkkana" meaning carrot; it also contains the English word "pork" and Finnish word "kana" meaning chicken, two common livestock in the food industry. The carrot is similarly one of the most popular economic plants in the food industry and the most popular root vegetable in Finland (Rubatzky, Quiros & Simon, 1999; Manninen, 2018; Järvelä & Niinisalo, 2006). Similar to pigs and chickens, carrots' reproduction is regulated by history, human aesthetic preferences, tastes and the needs of the industrial food production.

PORK KANA project aims to produce non-selectively bred carrot seeds — which means that I will let the carrots do their own reproduction and not choose which individual plants get to make seeds. The first crop of these "sexually liberated" carrot seeds have been collected in the fall of 2017 and different batches of seeds have been now made in to new cultivars named #001, #002 and #003. The names come from the different containers that the seeds were collected in. The ancestors of the carrots in PORK KANA are varieties from the neighborhood of Fennoscandia, wild carrot and some commercial colored root varieties. I have chosen to

exclude F1 hybrids, since they have been designed to produce offspring with bad reproduction capabilities.

Attached to the printed version of this thesis is some dormant PORK KANA carrot seeds. Different colored vials contain the different varieties of the PORK KANA cultivars: #001 is in the blue vial, #002 is in the yellow vial and #003 is in the orange vial. As you read through this thesis they will be "staring" at you, waiting and sensing for the possibilities to start growing and sensing you as you read or handle this book until their likely death around fall of 2020. But still they will contain the inherited DNA of their ancestral carrots with all their memories and traumas of the past.

Carrots are somehow very interesting as they have been with us for so long and often we take them for granted and don't realize their agency and subjectivity. They seem to be like tools that we can use to make our diet more delicious.



## Me

*"The earliest and most elementary "self" is the (bacterial) cell shown in the figure I.1. All cells show all the properties of life: they have "identity". All have an inside (the self) and an outside (the environment), defined by their boundary membranes made by the cell itself. Membranes are made of fatty materials (lipids) in which specific proteins are embedded. The entry and exit into and out of the cell of small charged salt ions — either positive ones, such as sodium (Na+), potassium (K+), magnesium (Mg2+), or calcium (Ca2+), or negative ones, such as chloride (Cl-), sulfate (SO2-4), or phosphate (PO3-4) — help maintain the self. Cells are selves: they are systems, and thus each part of the system must always be in place and active to maintain the self. Bacterial cells are sensitive and respond to major environmental stimuli. These stimuli include water with and without dissolved salt ions. Bacteria respond to gravity, position, hot and cold, and thirst. They respond to sound as movement (they are mechanosensitive) and to taste and smell (they are chemosensitive), and they react to light (they are photosensitive). Living and growing bacteria cells absorb appropriate energy, incorporate carbon and energy, and release particular wastes. Most grow to make larger versions of themselves. Most eventually reproduce or die trying. Sensitivity, awareness, and consciousness correlate with living behavior, which evolutionarily began with bacteria.*

*The bacteria that we denigrate as "germs" and rally to destroy sense salts and*

*sugars, the slightest wind, the gentlest raindrop, and the incessant downward pull of gravity. "Prototaxis", according to the biologist I. E. Wallin (1927), is the "innate tendency of one organism or cell to react in definite manner to another organism or cell." Prototaxis evolved in bacteria on an Earth with shorter days and nights, a more influential (because closer and "bigger") Moon, and air depleted in molecular oxygen. This is the environment in which awareness first seems to have flickered into being. Where and how did it do so? How did "awareness" evolve among the interacting cells of life and generate you, who have now begun read a book on evolution?"*
(Margulis, Asikainen & Krumbein, 2011).

Back in elementary school one of my favorite subjects was biology. I loved everything living and felt connected with the living world. I especially was interested in small ponds and creeks. The plants, insects and small animals living in these puddles, fascinated me. I was afraid of the sea. Its vastness, depth and power scared me. And not to think about all the crazy creatures living in it! But the vastness of the northern forests was never scary to me. It was and it still is a place where I feel most attuned.

My childhood was divided between the North and the South geographically. I was born in the North, but our family moved to South before my school started. I would spend most of my vacations at my grandparent's place and especially at their summer house beside a small lake in North-East Kuusamo some 15 km from the Russian border and roughly 800 km from Helsinki. The difference of the northern wilderness and the urban life with southern Finland was striking and I have realized it only when I have become older. Before that I didn't make any difference between the two. I would eat my wild salmon and reindeer meat at the



small industrial town of the South and not think about the awkwardness of it all.

My grandfather was a truck driver and during his free time he hunted, went fishing and berry picking, this has been a common habit in that neck of the woods. Food was pricy and there weren't any supermarkets back in the day. Just recently I heard that before when there wasn't yet a boarder, people there used to go fishing at the White Sea. My grandfather was active in the labor union movement and in the Social Democratic Party. He was also a very vocal environmentalist. All this made him a bit of a weirdo"red" in the predominantly Center Party voting area. I remember my mother telling us how embarrassed she was on the labor unions' 1st of May parades. The parade was terribly small and seeing her father dressed in an all red sweat suit carrying the emblems of his labor union was too much for her. I guess she was bullied a bit because of her father's political views.

I think my interest in biology is partly because of my grandfather. Ever since I can remember I have been taken into the wild. To pick berries, or fish, to ski or just to have a picnic. And the key figure has been my grandfather. He taught me how to fish and row a boat, how to approach a lake or a river (you need to be really quiet and respectful) and understand how fish move in the water, and how they behave. He also taught me how lakes and rivers can't handle all the nutrients coming from the surrounding fields and at age of 8 I already knew how to solve this problem — thanks grandpa. The problems of hydroelectricity were clear to me very early on. I would spend many days in the wilderness and learn how to keep myself warm in the cold northern summer nights among other useful skills and of course to fish my own food. I think my

Our grandparents summerhouse

grandfather's approach to fishing and hunting was something different than what it means to many people today. It was more about fishing for food and not for sports. It was never about the thrill of the kill and he was very clear that killing a living being had to happen quickly and with respect. To me as a child seeing the dead fish twitching at the bottom of the boat as its life escaped its body was frightening.

Then there is the comforting solitude of the silent wilderness. The relaxing sound of the boat's motor as the boat swims slowly across the lake under the huge blue and white sky. And relaxed anticipation as you fish at the river slowly going down the stream. The repeating movement of throwing the lure into the stream and reeling it in. Throw, reel, throw, reel, throw, reel and so on. Catching a trichoptera (a species of butterfly looking bugs) flying on top of the river surface to see what colors they have this time of the year and then choosing a similar colored lure to fool and catch the fish. Then eating silently at the campfire. The sound of billion mosquitoes, some men talking in the distance. A forest mouse climbs on my boot and the two of us stare at each other for a bit.

Gutting a fish. Guts, shit and death. Did he understand the problems of over-fishing and food production on industrial scale? When I became a teenager after seeing Bambi and other human-like animals in cartoons, I started to think about animal death and killing. During my teens I heard about animal activists releasing fur trade foxes to nature. I also joined the local Friends of the Earth organization. This was the time when global warming was called the greenhouse effect. I became more critical towards killing animals and didn't want to go fishing anymore – but i did anyway. And when my granddad took me to my first hunting trip, I couldn't stand the idea of killing the bunnies. My granddad didn't



have much respect towards the "new environmental activism – these 'Greens'" and we had arguments over these issues. Maybe it was a generation thing… I never really was an activist in the sense of being active in any group. It might have been because of my social anxieties, but I was very eager to take part in random conversations and sporadically took part in some activities. A friend of mine compared us to the rōnin in Japan some years ago. I guess this describes me somehow, a masterless free fighter.

So, in my teens environmental issues and not killing animals was a trend and I wanted to be part of that trend. But I didn't see any problems slicing a carrot into pieces. I didn't think about it until my nephew's father in one conversation asked "what is the difference between cattle and a field of wheat?" Nothing - I thought. It's all the same.

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Since my teens I have been interested in the breeding that we humans did. It amazed me how much humans have affected many of the organisms we live with. The easiest example of breeding activity is maybe the different dog breeds or the long tail feathered Onagarodi roosters bred in Japan with tails that can be many meters long. Humans have played with many traits of the living beings and changed their size, shape, and color among others. Commercial animal breeding has produced pigs that can now have more babies. But the sow can't feed all these babies because there are not enough teats on her. Animal improvement programs (breeding) programs are now studying how to get more nipples on a pig so that the sow can feed more piglets (Genetics of Teat Number in Swine, 2016) and so produce more meat for the market.

During the application process for ViCCA, I heard about BioArt for the first time. The term fascinated me a lot. I started to play with the idea of what it could be. Stupidly enough, my first reaction wasn't to read about it but to think about it. This happens to me a lot. I played with the idea of using biology as a tool for making art. Later I found out that BioArt is often connected with synthetic biology. I have always found gene manipulation distasteful. Who has the right to say what kind of beings there are in the world? Or why should living beings become tools or machines for our enjoyment. When I first heard about gene manipulation I was at 8th grade or something. I found it extremely funny and started to plan my own gene manipulated organisms: a dancing banana that would strip its own skin or a tomato that would cut itself into wedges while singing a song.

During that spring 2014, while I was waiting for the results of my application, I bought some French tulips. Their meandering long stems exploded into a mix of colorful petals. As they kept on growing, gravity made their stems bend down. If they had been living in the wild most likely their flowers would have rotten in the ground before they could have produced any seeds. I started to think about all the organisms developed by humans that couldn't survive without humans. I have never again bought French tulips. But the human fascination of deformed organisms is interesting still.

At the beginning of my studies at ViCCA, I took the Biofilia ABC course. I had always wanted to work in a bio lab. Great! But to my surprise I found working with cell cultures somewhat horrible. I might be little too empathetic, but the way the living cells were used seemed very painful to the cells. The mouse cells in pink liquid twitching under the



microscope seemed to be screaming for help. E. coli that had some fluorescent DNA grafted to its DNA through various ways of abuse seemed like a beat up Frankenstein monster glowing under the UV light. I did the ABC course, and decided that I won't be doing that again. It seems that biology is going towards engineering science and I'm not into that.

*"A foreign body is a thing that has entered the human body either through natural orifices, or by force – like a swallowed tooth brush or a bullet.*
…
*The foreign bodies eventually become things that originate from the human body itself, like a starfish detaching its arm, just to regenerate."*
(Fasanino Jansson & Inkerö, 2018)

At "Environment. Now? The Trouble with Interdisciplinary" course, spring 2018 professor Pia Lindman hypothesized about adding foreign objects to one's body. She suggested that science can replace for example a bone inside of a human body and this metal bone will have the function of support that the previous bone had and give the possibility to walk. But what science maybe misses is what the experience is of the surrounding matter around this metallic replacement. Similarly, I would like to ask: "What might be the experience of the organism that has this new gene added? Ok, it might be now producing remarkable new things but how is the organism doing?"

I have been helping carrots to reproduce freely. The carrot serves as a starting point to investigations around biology, plant life and human aesthetics. How have we humans affected the evolution of the carrot or any other of our companion organisms? What are the decisions we make in the evolution of the carrot? And is it possible to let the carrot

have its own voice? Or are my decisions where and when to plant etc. affecting the carrot's evolution?

Also: As a white cisgender gay male, it is difficult for me to reproduce but, maybe I can help carrots reproduce.



## History of the Carrot (Daucus carota subsp. sativus) and the ancestors of PORK KANA carrots

Apiaceae is a plant family also know by the name of carrot family. Apiaceas are herbaceous plants which flowers are usually umbels consisting of number of short flower stalks spreading from a common point (for reference see the carrot flower on the cover and on page 50). The family contains such plants as anise, caraway, celery, coriander, cumin, dill, fennel, parsley, parsnip and carrot (Rubatzky, Quiros & Simon, 1999). First apiaceas appear around 87 – 54 million years ago. First fossils of seeds thought to be apiaceae seeds have been found in Wyoming and Montana U.S.A and are 69 million years old (Stevens, 2001). Origins of the domesticated carrots are probably in Central Asia where its wild ancestors grew around area what is now known as Iran and Afghanistan (Iorizzo et al., 2013).

*"The time frame and geographic region(s) of the first cultivation of carrots are unclear. Vavilov (1992, pp. 337–340) identified Asia Minor (eastern Turkey) and the inner Asiatic re- gions as the centers of origin of cultivated carrot and noted Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan) as being "the basic center of Asiatic kinds of cultivated carrots" where "wild carrots ... practically invited themselves to be cultivated". As observed by the presence of carrot seed at prehistoric human habitations 4000 to 5000 yr go (Newiler, 1931), it is speculated that wild carrot seed was used medicinally or as a spice (Andrews, 1949; Brothwell and Brothwell, 1969). Carrot was cultivated and used as a storage root similar to modern*

Wild carrot (Daucus carota) root
also known as bird's nest, bishop's lace, and Queen Anne's lace

*carrots in Afghanistan, Iran, Iraq, and perhaps Anatolia beginning in the 10th century (Mackevic, 1932; Zagorodskikh, 1939). On the basis of historical documents, the first domesticated carrot roots were purple and yellow and recorded in Central Asia, Asia Minor, then Western Europe and finally in England between the 11th and 15th centuries (Banga, 1963). Interestingly, orange carrots were not well documented until the 15th and 16th centuries in Europe (Banga, 1957a, b; Stolarczyk and Janick, 2011), indicating that orange carotenoid accumulation may have resulted from a secondary domestication event."*
(Iorizzo et al., 2013)

As mentioned in the previous quote, through its history the carrot has had many different uses and has been of many colors. But for some reason the orange carrot now dominates the world. According to Banga (1963) the first appearance of orange carrots in a painting is in Joachim Wtewael's painting "The Fruit and Vegetable Seller" from 1618 currently in the collections of Centraal Museum Utrecht, Netherlands. On the lower right corner of the vegetable sellers table there is bunch of white long roots (carrots or parsnips?) and next to them purple, red, orange and yellow carrots. Also, it is notable that some of the carrots have many roots, unlike the present day one which has a straight root. Orange color was very much appreciated by the Dutch since it was the color of their independency and of their royal family. It is thought that all orange colored carrots originate from this mutation that happened in the Netherlands around the 16th century. I have seen a picture of an orange many rooted carrot from a 6th century copy of Dioscrides' De Materia Medica. It is not clear if the color of the carrot in this book was originally orange or has it become orange because the pigments on this picture has faded and changed during the centuries of its existence. But



what is thought to be certain is that the contemporary orange carrots all have their ancestors in the orange mutation that happened in the Netherlands.

It is unclear to me when carrots arrived to Finland. According to Maatiainen-magazine (1/2018) first mention in Finnish of the carrot is from 1745 in a dictionary "Suomalaisen Sana-Lugun Coetus" by Daniel Juslenius. But what I remember reading and hearing is that growing vegetables hasn't been that popular in Finland. During a visit to an iron works mansion Fagervik, I heard that cucumber was first grown in the mansion's green houses around the 18th century as a fashionable luxury vegetable. In a radio program on YLE (Nevala, 2015) about the war times in my ancestral land of Kuusamo, Finnish people who used to work for the Nazi Germany army saw for the first-time people growing lettuce and other vegetables when the German soldiers had vegetable gardens around their barracks. But then again people have been traditionally growing turnips and maybe they've grown carrots too. I have seen online a page of a 19th century Finnish farming guide describing an orange and white carrot and explaining that these are grown for human and animal food, I don't know the source of this information, so its authenticity is questionable. All in all, how the carrot arrived to Finland remains a question I need to research more.

The ancestral lands of PORK KANA carrots (Daucus carota subsp. sativus) are in Russia and Estonia. Same directions as the people we now call Finns came to the Finnish peninsula. The PORK KANA carrots also contain other origins but I don't know the origin of these colorful variants since they were commercial seeds that do not have their origin mentioned. I have grown also wild carrots (Daucus carota subsp. carota)

among the different varieties of carrots and now all these have crossbred together.

Carrots are biennial, this means that the first year after planting the seed, they will grow a root that is usually the thing we find in the supermarkets for us to eat. But if you plant that carrot root next spring to a sunny location it will most likely grow a flower and hopefully produce seeds. After the second year the carrot dies. Its root is now sucked out of all, life force, the juices and nutrients it had. During winter storage in the cellar I have noticed its better not let carrots to touch each other or they will start fighting for nutrients and space. I have found root networks from healthy carrots to a rotting dead one that have been sucking nutrients from the dead individuals body.

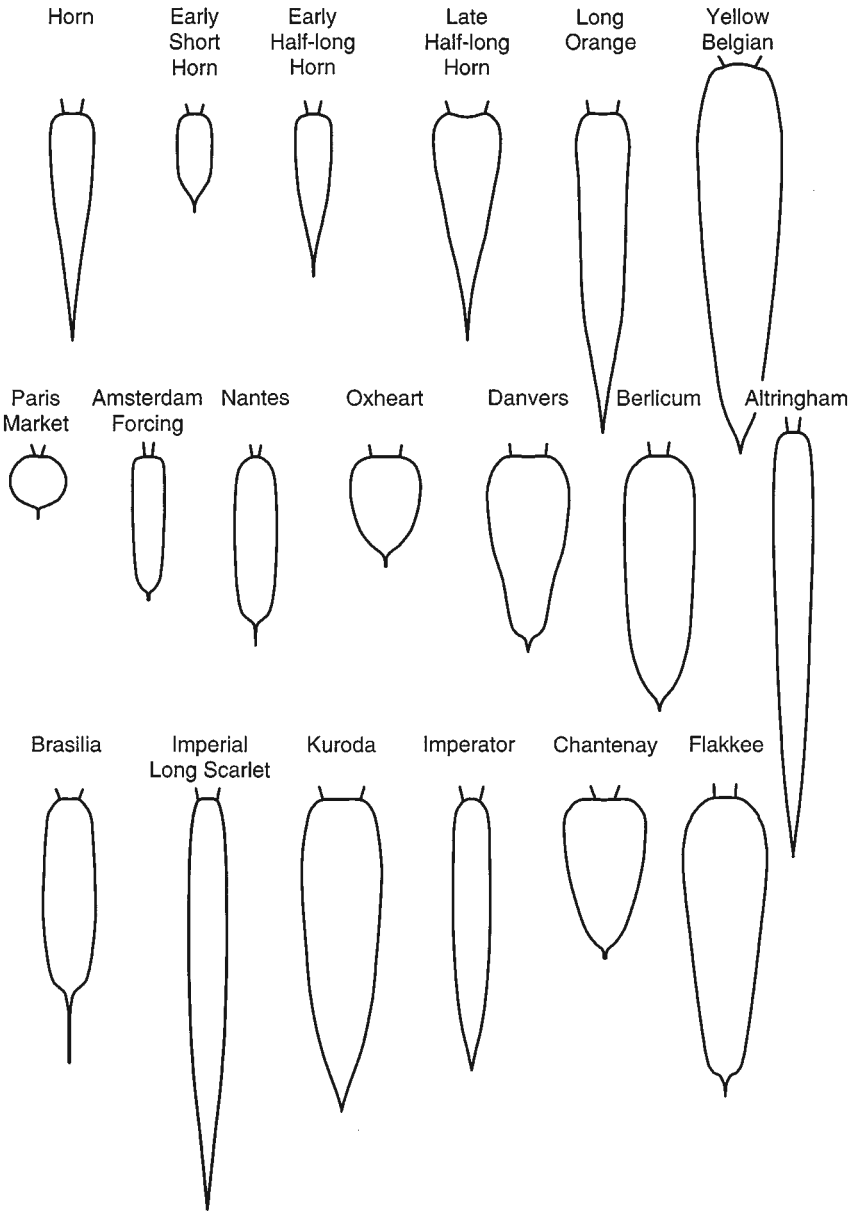


## The use of carrots and carrot related matter

*"Most domesticated creatures have been shaped by humans' aesthetic preferences."*
(Gessert, 2010)

I have been talking with my garden lot neighbors about growing carrots. Usually people consider carrots to be difficult to grow as "they don't grow well, they become all weird shaped with many roots and not the beautiful one root. I have given up on them. Just awful to grow!" I have heard this line so many times in different forms from so many people. What is interesting in this, is the idea that people seem to have an ideal carrot in their mind. It's usually straight one root with nice pointy end in bright orange. Anything else is a failure in gardening and a bad carrot.

Järvelä & Niinisalo (2006) study on Finnish consumer views on quality of carrots is an interesting document on how the general public sees carrots. The name of the study says so much: "Kunhan on makea ja maukas" which translates to "As Long as It's Sweet and Juicy". The consumers are merely interested in the sweet and juicy taste and feel that the quality of the carrot isn't consistent enough, especially during winter the consumers think that the quality varies too much. Summer carrots, people consider as a special delicacy. The consumers wish that it would be possible to improve sweetness and succulence of carrots.




The name of the different shapes of carrots give a hint of their origins.

Kuroda is a Japanese variety. (Picture: Rubatzky et al., 1999)

A vegetable seller told me that there is a shape difference with winter carrots and summer carrots in Finland. The fresh summer carrots have to have a pointy end and the winter carrot a rounded end. The buyers will notice the difference and round ended carrots don't sell that well if sold during summer. But there might be a more practical reason to this also: the round ended carrots don't get damaged when being handled during the winter storage. The pointy end easily snaps off and this cut can easily be inhabited by various organisms and become infected. I guess the industrial carrots are mostly round ended so that the carrots can take the machine operated handling. Apparently, there are different carrot varieties with different shapes each suitable for different soil. People have been today getting more interested in the different colored varieties of carrot and they also have started to play with the shape of it. But the PORK KANA project is not thinking about what shaped beings should inhabit this globe.

## Carrots as commodity

Carrots are seen as a symbol of health, vigor and vitality. They are a symbol of vegetarians, vegans, Food not bombs organization, rabbit food and Bugs Bunny. Many babies' first solid food is carrot. A friend of mine had her first baby a while ago. She told me that the teachers in her kindergarten are urging some parents to maybe ease on feeding so much carrot to babies. Some of the babies are turning ever so slightly orange because of high amounts of carrots they eat.

Carrots' universal orangeness penetrates the minds and bodies of almost every and all human on the earth and outside of it. It is so easily forgotten but still so elemental. You can peel it, cut it into coin shapes, eat it as it is, shred it, cook it, make soup out of it… The list is endless! Nom nom nom! It makes you feel healthy. Like you made an effort to eat a whole vegetable. Carrot juice. Carrot characters parading in animations walking tall and high. Maybe they have a top hat on. And a walking cane. Singing a happy song with a tomato and a banana.

You can hang a carrot in front of a donkey to make it move into directions you want to. Or try the stick? I have always believed in the carrot rather than the stick. But so does Satan. He promises all the wealth and fame on earth but in the end, you are doomed.

## On carotenoids

The name carotenoid comes from the Latin word "carota" meaning carrot. Carotenoids are natural pigments found in chloroplasts of plants and other photosynthetic organisms. These pigments are one of the reasons why leaves turn yellow, orange or red in the fall as the chlorophyll disappears from the leaves. Carotenoids also take part in the photosynthesis and protect the organism from the sun's UV radiation since the pigment has a good capability to absorb blue wavelenghts of light. There are several hundreds of different carotenoids.

Flamingos become pink because the food they eat has a lot of carotenoids. Similarly, a human can become distinctively orange if they consumes excessive amounts of carrots or other organisms containing a lot of carotenoids. Carotenosis is the condition where the high amounts of carotenoids in one's body starts to collect in the outermost layer of the skin. The condition is easily reversed if one stops using high amounts of carotenoids. Some people call this condition also "sunless tanning" and it is considered as relatively safe.

Synthetic carotenoids are widely used in the industrial production of salmon, chicken and their eggs. Carotenoids are responsible for the color of the salmon flesh, egg yolks or the color the chicken skin. The pigments are fed to salmon and chicken in their feed as additives. In the wild, the color of salmon varies according to the food available for the salmon. I was talking to a fish seller who told me that humans tend to not buy wild salmon that is not pink enough, even though salmon in the wild will be anything from yellow to pink.



The company DSM has a product called Carophyll®. The following are quotes from their webpage marketing the product:

*"CAROPHYLL® – because color matters*
*Much of the pleasure we derive from food comes from its visual appearance, so the color of food ingredients is extremely important. We offer products that allow consistent delivery of precisely-pigmented egg yolks, poultry and fish."*
(CAROPHYLL® – because color matters, 2011)

*"A golden yolk can only come from a healthy hen*
*Consumers worldwide are increasingly aware of the importance of healthy foods. They know that a golden yolk is the sign of a fresh egg from a healthy hen. The right husbandry, welfare and diet, in combination with CAROPHYLL® carotenoids, deliver eye-catching egg yolks that inspire consumer confidence around the globe."*
(A golden yolk can only come from a healthy hen, 2011)

The company has specific "Color Fans" to determine which colored fish flesh or chicken skin or egg yolks does one want to produce. What this product does inside of the animals is similar to carotenosis in humans. By regulating the amount of the pigment in the feed, you can choose the right color for each season and to the liking of the human fashions. The company has also a product called "MaxiChick™".

I had an artistic experiment idea called "Human Egg Yolk". I would try to consume as much of carotenoids as possible and use the egg yolk Color Fan as measurement tool and try to achieve the latest fashion-

able hue of egg yolk on my skin and become “eye catching” and “inspire consumer confidence around the globe”. Unfortunately, I haven’t had the opportunity yet to do this. Also, the company wasn’t interested to send me any of their Color Fans or any other material. The presidency of Mr. Trump has also made this project a bit questionable. And what would it do to my already weak health?



## The garden of the (not so) simples

*“Imagine a being capable of processing, remembering and sharing information – a being with potentialities proper to it and a world of its own. Given this brief description, most of us will think of a human person, some will associate it with an animal and virtually no one’s imagination will conjure up a plant. Since 2 November 2011, however, one possible answer to this riddle is Pisum sativum, a species colloquially known as the common pea. On that day, a team of scientists from the Blaustein Institute for Desert Research in Be’er Sheva, Israel, published the results of their research, revealing that a pea plant subjected to drought conditions communicated its abiotic stress to other such plants, with which it shared its rooting volumes. In other words, through the roots, it relayed to its neighbours the biochemical message about the onset of drought, prompting them to react as though they, too, were in a similar predicament. Curiously, having received the signal, plants not directly affected by this particular environmental stress factor were better able to withstand adverse conditions when these actually occurred. This means that the recipients of biochemical communication could draw on their ‘memories’ – information stored at the cellular level – to activate appropriate defences and adaptive responses when the need arose.”*
(Marder, 2013)

Orto botanico di Padova is the oldest existing university botanical garden in the world established in 1545. It‘s also called “Gardens of the Simples” or Horti simplicum. The simples here refer to simple medicinal plants. But the “simples” does echo nicely the attitudes that people had towards plants back then and most people today have: plants are simple

automatons that just eat and reproduce and are there for humans and animals to consume. This thinking can be traced back to Plato. According to Hall (2011) Plato attributed plants with the lowest level of his tripartite soul. Plants are given the appetitive soul and are denied the spirited soul (activity and volition) and the rational soul (intelligence and self control). Plants are given the same appetitive soul as slaves, women and children. Only the men have the appetitive soul, spirited soul and the rational soul. This position for the plants seems to dominate Western thinking until the present day when thinkers like Michael Marder and Paco Calvo start to study plant intelligence, plant behavior and plant neurobiology.

In a video by Filippe Pirl (2016) he interviews Minimal Intelligencen Laboratory (MINT Lab) researcher Paco Calvo. One topic in the video is where Calvo explains his hypothesis about plant intelligence. In his study he uses the climbing bean (no species specified) to show how a plant seems to perceive its surrounding during its rotational movements searching for support. The rotational movement of the bean is documented with the use of time lapse photography. The plant seems to be able to detect possible supports in its surroundings by changing its point of view and then change its rotational behavior towards the support that is next to it. The ability to close a gap between the beans location and the support shows the ability for the plant to use its inner information and the outside information gathered in a way that according to Calvo shows a level of minimal intelligence. The video also shows this happen and, as Calvo mentions, the plant at some point seems to be "fishing" or aiming at the pole as the circular motion seems to be distracted by a straight movement towards the support pole.



Michael Marder is a philosopher at The University of the Basque Country researching plant philosophy. He has written extensively about plant intelligence, plant thinking, plant movements and so on.

*"Plant intelligence entails, at the most basic level, the subjective constitution of lived space and time by the plants themselves. Plant behavior is marked by a successful (from the practical or pragmatic point of view) orientation in local environment, taking into account minute changes in temperature, humidity gradients and so forth."*
(Marder, 2012)

## Gardening

It is incredibly hard sometimes to get to the garden lot, almost as hard as trying to write this thesis. The bus ride to the garden and walking through the larch and oak growing test field seem so long and blergh. But then as you enter the edge of the forest where the lot is, you suddenly start to feel how stress and the pain of getting there starts to melt. It seems like your stress levels and blood pressure go down, you get excited and finally when you see the carrots and other plants it feels like they are dogs that have been waiting for you to get to home. Of course, they don't bark and jump at you but there is something that says "Hi!" Or I might be going crazy… But I have heard of similar feelings from different people working with plants.

This brings to my mind one experience: One night I was handling a prayer plant (Maranta leuconeura) living at my window. I felt that in that moment, I had some kind of connection with it, I cannot describe what exactly happened but for a moment it felt like I was experiencing the plant in an abnormal way. That night the prayer plant lifted its leaves up like it does every night. Also, that night a couple of leaves were turned towards my bed and desk, places where I mostly spend my time when I am home. It had never done that and it felt like it maybe was looking at me. Like it would have lifted its antenna resembling leaves and was sensing something about me and I about it. For a moment it felt like we were looking at each other for a while. The plant hasn't done this ever since.

In Bureau D'etudes "Electromagnetic propaganda" (2010) is a section



that compares the images of a leaf of a beech to a logarithmic aerial, the twig of a spruce to TV and FM aerials and insect antennae to logarithmic aerials. In the text part they present a couple of studies studying possible electromagnetic radiation effects on plants.

I have heard from old women along my research that plants seem to sense your feelings and thoughts. And they have talked how plants have seemed to even console sad people. I know of a family in Finland that has a tradition of growing plants and having a somewhat of a special relationship with them. The family talks to plants and I think the older members of this family say that they even can hear the plants respond. Apparently, this tradition has been with the family several generations or at least the members of this family don't know where or when this tradition started. Maybe it's needless to say but the family is still farming and taking care of the land.

I have also a zamioculcas living by my window at home. I've always had somewhat bad thoughts and feelings towards it. I don't know why but I somehow have hated it. I guess it has something to do with the looks of the plant: it reminds me of office decor of the 2000's. The plant wasn't doing that great, its leaves and branches kept on dying. I have tried to change my attitude towards it and now this spring it has started to grow one big new branch. This might be coincidence but there is something strange in this.

I don't really necessarily talk to my plants, but I have this method of talking to them in silent: I will concentrate my thought towards them and in my mind say what I want to tell them, which doesn't necessarily mean anything about if this is really true that I could convey something

to the plants but that's the way I have chosen to live with them. But if I have something really important that I would like to say to the plants then I do say it out loud. Maybe the resonance of my voice penetrates the vegetal bodies and moves something inside of them. Who knows.

Carrots are usually grown in rows. Usually all garden plants are grown in this way. Sometimes they are planted with other plants that have been found to help the others grow and flourish. This means that for example first a row of marigolds is planted and given the amount space they need, next a row of carrots, and then a row of onions and so on. Carrot has a few of these companion plants. I have chosen to grow beans, onions and marigolds among my carrots. There are other plants that don't do that great with carrots e.g. its close relatives coriander and parsley. These other plants are planted to a good distance from the carrots.

I have also developed a method of trying to imitate meadows in my garden. This means that I will not have straight rows of same plant, but I rather randomly plant onions, seedlings and short rows of seeds. I have this method of drawing on the soil around the planted plant matter the required space they need to grow and then planting next plant matter outside this safe zone. This creates a meadow kind of vegetable garden where plants are in a "talking distance" of each other.

Snails crawling across the plastic bag left to protect the tools in the garden. It leaves after itself a trail of snail shit. You grab the bag and smear that shit all over your fingers by accident. It feels gross. You greet a Spanish slug (Arion vulgaris) on the pathway to the garden lot. You have made an agreement with them that if they stay on the patches of meadow between the roads and the ditch you will let them live. But if



you find even one of them from your garden you will kill it. Immediately. You find one in your garden and you lift it on a wood pole and smash it with a piece of wood. Snail slime flies everywhere. Let them smell the death of its kind. You find the skin of a dead rabbit, you spread that fur all over the garden to make the bunnies smell their own death. Don't come eat my stuff! Next up: fuck you voles and annoying garden lot association people.

## Art of breeding

George Gessert is an artist who has been breeding plants as an art form since the late 70's. His main focus is the hybridization of wild irises. Whereas Gessert seems to be making wonderful human pleasing new varieties of irises, my work aims not to please us humans (necessarily). It's maybe more art for carrots but there is the human activity involved. Carrots wouldn't survive as the subspecies we now know them unless there would be humans involved. Or at least this is the case in Finland and any where with freezing winters. But never the less the carrots of PORK KANA make me, the human, and (possibly other humans in the future) to work and perform tasks in order to let them flourish. And if we would think of all the labor that goes into gardening the carrots as a performance piece, it would maybe be one of the longest performance pieces in the world.

Throughout this thesis there has been some quotes of texts that I see important to quote as they are. For me they seem like poetry and as such it is difficult to put them into my own words, and why should I when somebody has already said it better than I could ever do. Following text written by George Gessert is from his book "Green light: toward an art of evolution" (2010).

*"In the past, most economic animals were selected for both utilitarian and aesthetic qualities. We see the result of such choices in the coat patterns of llamas, the colors of chicken eggs, and the shapes and sizes of goats' ears. Under most circumstances, people try to imbue the instruments of their survival and*



*well-being with some of the characteristics of art. With the industrialization of agriculture, however, this kind of genetic folk art has been marginalized and largely replaced by breeding that focuses exclusively on economic profit.*

*The result has been dairy cows that are blotched and bug-eyed, ponderous bio-reactors afflicted with vestiges of sentience. Sheep bred for industrial production have all the charm of greasy stuffed toys. Many are incapable of birthing without human assistance. Factory-raised chickens have lost the instinct to care for eggs. The "best" hens lay more than 200 sterile eggs a year and apparently suffer nothing from the loss.*

*Unlike functionally designed cars or cell phones, animals bred for industrial production exist largely out of sight of consumers. This makes the suffering of industrial animals invisible, and also their aesthetic degradation. Selection for productivity has proved immensely profitable, but its trajectory seems to be toward blobs in vats. Perhaps cows and chickens are on an evolutionary path that in the distant future will converge with fungi tended by leafcutting ants.*

*The most extreme evolutionary experiments in nonaesthetic selection are with fruit flies. Although fruit flies have been domesticated for only a century, they manifest changes more far-reaching and bizarre than any other domesticated animal, even goldfish. More than 13,000 fruit fly variants are cataloged. Some flies have branched legs, legs in place of wings, or antennae erupting from their eyes. There are flies with extra eyes, or no eyes at all, or bodies covered with lesions and tumors. Many cannot survive outside carefully controlled laboratory environments, which makes these creatures among the most specialized and dependent of all domesticates.*

*A few changes in fruit flies, such as iridescent eyes, are aesthetically pleasing,*

*although difficult to appreciate without a magnifying glass. Ordinary flies have two wings, but geneticists have created a four-winged fly that in photographs looks like a rather lovely moth. However, many domesticated fruit flies amount to genetic ruins.*

*Highly bred economic animals often arouse contempt or pity, but highly bred economic plants rarely seem debased. Orchards, vineyards, and fields of grain can make pleasant landscapes, and some food plants double as ornamentals. This brings us to the most diverse category of aesthetic domesticates and the most common, ornamental plants."*
(Gessert, 2010)

I appreciate Gesserts work, thinking and writing. I just don't feel comfortable enough to be the one to makie the decisions on what kind of beings there are.



## Inherited trauma

I go to therapy. I have discussed some of my traumas in therapy. It is evident that I have them and now I try to deal with them or maybe more likely become more aware of them. Recently I first time heard about minority stress among gay men and the sickening loneliness of the gay community (Hobbes, 2017). So there is that and I have also inherited traumas. And according to recent studies it might not be only psychological but traumas may be inherited in our DNA too (Pember, 2017).

All of my grandparents have had to move away from their homes in traumatic situations. 3 out of 4 had to evacuate as a child from their homes because of war, 1 had to leave his family home because of his mother died. 2 could return to their ancestral lands but all that was left was burnt villages. One type of Finnish small talk is asking people where they are from. When I am asked I can't say one place so I reply "I'm from nowhere". I have moved 27 times in my life, I have lived in 6 different cities in 2 countries. I have always carried a ton of stuff with me, I always have to have a bag with me. One of my teachers in elementary school used to joke that "Lauri is ready to evacuate at any moment." I am from nowhere and I am the offspring of displaced people. And I am always ready to move on. I have thought that the PORK KANA project makes me stick to one place at least for summers. I have to keep planting and attending the carrots but in the winter they can stay in their dormancy and I am more free to do what I want.

Could plants have traumas? Could they carry memories of the traumas of the previous generations in their DNA?

*"But do plants also "remember" what to do? Maybe so. In 2014, Dr. Monica Gagliano and colleagues at the University of Florence in Italy decided to see if they could train a plant to change behavior.*

*The researchers chose Mimosa pudica, more commonly known as the touch-me-not, which curls up its leaves in response to physical stimulation. Test plants in their pots were dropped onto foam from a height of about six inches to elicit the flinching response.*

*After repeated exposure with no major harm, the plants no longer recoiled. Even after a month left alone, the plants "remembered" the falls weren't harmful and ignored them. Dr. Gagliano, now at the University of Western Australia, concluded from the experiment that plants could "learn" long-lasting behaviors, sort of like memories.*

*But a review published last month in Science Advances suggests that one can look at it another way as well: the mimosa pudica could be learning to forget. Peter Crisp, a molecular plant biologist at Australian National University and author on the review, suggested that plants "forget" to flinch when it turns out that the threat does no harm. Forgetting has a purpose, Dr. Crisp and his colleagues say: It allows plants to save energy."*
(Klein, 2016)

Could the plants that are flown in planes to plant shops in Finland remember the greenhouses of Netherlands? Could the seeds of the carrot contain the memories, experiences or traumas of the previous generations of carrots? What are the memories of bananas shipped from South America to Finland? And are we eating these memories that are chemical changes in the tissue of the fruit?



Every time I bring home a new plant, it seems to be a bit sad for a while. It loses a couple of leaves, it seems like it has a low will to live. On the discussion boards of house plants, I have heard of talks about plants going through stress periods when they are brought to new surroundings.

Artist Annette Arlander sits on trees as one part of her "Performing with Plants" artistic research project. During her research in 2017 she had specific trees in Helsinki, Finland and Stockholm, Sweden she visits regularly and sits on them for a period of time. Her research makes me think about the speed of the trees' memory making and what kind of memories does sitting create on the tree. Since trees seem to have a very slow time understanding, it takes a long time for them to make a memory. I think Arlander's method of sitting on a tree leaves an interesting mark on the trees' memories. It is something that is repeated during a long period of time and it has the potential to leave a trace in the trees memories. And it is something different than the usual interactions the tree might have with humans: people passing by, someone maybe urinating on it, someone cutting its branches, someone digging the soil where its roots are, someone planting it and so on.

Artist Filippe Pirl has a video "Bromelia - a human plant porn" (2017) on Vimeo. In this video the artist is having an intimate moment with a Monstera plant in the shower as jazzy music plays and colors change. The artist tries to talk to the Monstera and it sounds like it's a couples'

argument about why the other part (Monstera) is not wanting to have sex with the other (human). But only human side of the couple is heard and the Monstera remains silent. "You don't care so much about my penis, do you?" the artist asks and strokes the leaves of the Monstera. The video ends in him kissing and caressing the Monstera. The plant remains still. But is it unchanged? What is the subjectivity of the plant in this situation? What is its experience of this event? Is plant sexuality similar to human sexuality? Do plants experience (sexual) pleasure?



## Seeds of the PORK KANA

The three different varieties of PORK KANA seeds seem to have differences: there is a good amount of #001 and it seems to have a good germination rate. There is only little of #002 but it has the best germination rate of them all. There is a lot of #003 but it has a very low germination rate. For some reason, I have the closest relationship with #001 and #002. #003 is just sitting at my kitchen desk in a ceramic bowl and for some reason I don't want to do anything to them. Is it because of the bad germination rate and not pleasing to me because it won't perform the way I want it?

It is not clear will the varieties remain as such or will they emerge to one variety at some point. But at this point they are now 3 different varieties and these seeds are distributed to people wanting take part in the project. They can choose to do whatever they want with them. In return I hope to be told from time to time what's going on with the offspring.

## Future PORK KANA

One possible future for the PORK KANA project is the attempt to set the carrot free from the human-carrot symbiosis. Maybe to become something like the feral cattle. Currently there are some difficulties doing this in Finland. The winter will freeze the firstyear carrots as the soil is frozen and so preventing the possible flowering of the second year. I have found small carrots from some gardens that seem to have survived the winter in Finland, but it isn't clear to me how this is possible. Maybe the small size of the carrot has helped it survive the winter or thewinter wasn't cold that particular year. But then again, where did the seed come from in the first place?

Another possibility for the carrot – human relationship could be something like the reindeers have with humans. Reindeers are semi-domesticated, living most of the time free, roaming in the wild. But few times a year they have interactions with humans when humans mark their own reindeer and harvest the amount of reindeer they need.

Daucus capillifolius is a relative to the carrot. "McCollum (1975) made hybrids between these two species and found them to be fully intercrossable, fertile, and morphologically intermediate, and suggested that D. capillifolius may best be treated as a subspecies of D. carota." (Iorizzo et al., 2013) In the future I need to see if this species would have better cold surviving properties and maybe start growing this among the PORK KANA carrots and thus give more possibilities for carrot independence in the climate of Finland.

In the future the PORK KANA project will better the genetic variation of the PORK KANA carrots by seeking more heirloom carrot seeds to be planted among the existing PORK KANA seeds. Also seeds of wild carrot from different parts of the world can be planted. I have found now that Hokkaido is famous of its carrots and I am currently looking into how could I get my hands on some Hokkaido heirloom seeds. Parts of Hokkaido have a similar climate to Southern Finland. I have learned from the heirloom seed people that it is good to give new genes to a population to keep the population healthy.

## About killing and death / death and decay

*Lifting heavy feet in clumsy shoes,*
*Earth feet, loam feet, lifted in country mirth*
*Mirth of those long since under earth*
*Nourishing the corn. Keeping time,*
*Keeping the rhythm in their dancing*
*As in their living in the living seasons*
*The time of the seasons and the constellations*
*The time of milking and the time of harvest*
*The time of the coupling of man and woman*
*And that of beasts. Feet rising and falling.*
*Eating and drinking. Dung and death.*
Excerpt from T.S. Eliot: East Coker



It is evident that killing other beings, is elementary for human survival. Also, it is evident that others' death is elemental to many non-human beings. We humans eat mostly dead matter, some beings consume still alive beings. But at the very end, we all survive because of dead matter. We create life from this death. Our bodies contain the capability to transform death into life. But how do we do the killing and consuming is a key question. Is it on a sustainable base and is the individual beings utilized treated with respect?

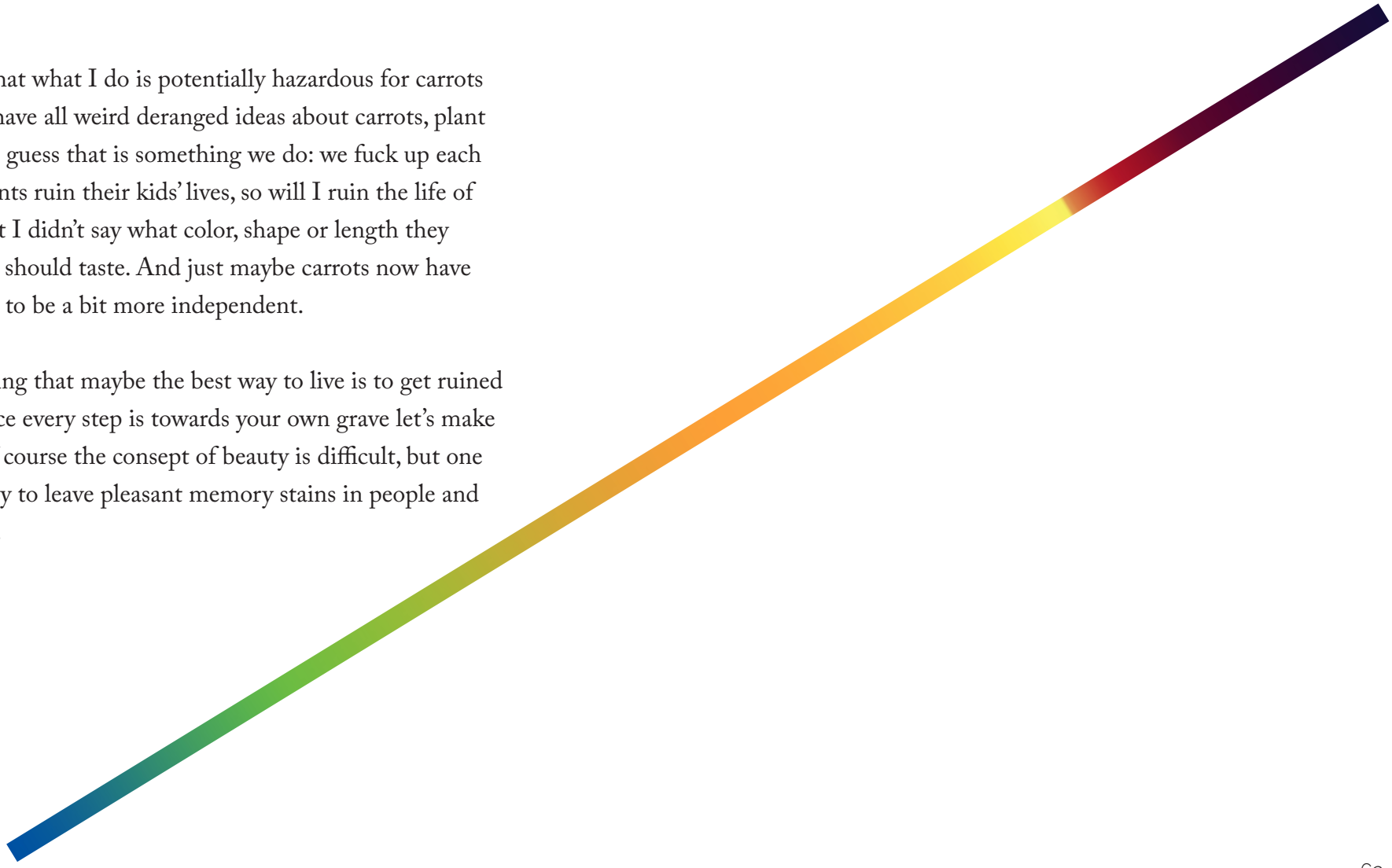
I have been staring at the plants. Looking at them and how they grow out of soil. Soil that consists mostly of dead rotting tissue of plants, bugs, animals… Microbes chewing them up into smaller pieces, worms digesting it into smaller pieces taking their part of the nutrients, breaking apart molecule structures and plants sucking nutrients out of this mess with their tender roots. Their roots strongly planted in death. For plants it seems that death isn't at all as much of a bad ending as our human death is. In plants' death, it becomes nutrients for the surrounding plants and organisms and maybe even its offspring will chew on it. We humans are dumped in a graveyard, our inheritance is considered to be things and belongings, money/debt, trinkets and photographs. But plants are eaten by the plants themselves at the end, all parts are used in order for life to continue. Nothing is stored and left to rot in banks. Gold in vaults, rotting and wasting time and effort. Plants don't seem to hoard, if they hoard their bodies might split — too much water makes the carrot roots split. Well I suppose this happens in humans too in case they become obese and their bodies can't handle the masses anymore. Then it is possible that their skin splits at the skinfolds and becomes infected.

## Fuck up other beings

*"Every organism is looking for another organism to survive."*
Koen Vanmechelen at his talk in Exhibition Laboratory, Helsinki, Finland 16.3.2018

There is a possibility that what I do is potentially hazardous for carrots and humans. I might have all weird deranged ideas about carrots, plant life and humans. But I guess that is something we do: we fuck up each other's lives. Like parents ruin their kids' lives, so will I ruin the life of the carrots. But at least I didn't say what color, shape or length they should be or how they should taste. And just maybe carrots now have had a moment in time to be a bit more independent.

Lately I've been thinking that maybe the best way to live is to get ruined in a beautiful way. Since every step is towards your own grave let's make the steps beautiful. Of course the consept of beauty is difficult, but one can try at least. And try to leave pleasant memory stains in people and non-people memories.



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